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SEABOURNE REPORT
VOL. III
OPNS & TECH OF THE
RDC, GERMAN WEHRMACHT

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THE SIGNAL INTELLIGENCE SERVICE
OF THE
GERMAN LUFTWAFFE

VOL. III

OPERATIONS AND TECHNIQUES
OF THE
RADIO DEFENSE CORPS, GERMAN WEHRMACHT

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VOL. III

RADIO DEFENSE CORPS (FUNKABWEHR)

By Captain Wilhelm Kelch,
Radio Defense Corps, German Army.

F O R E W O R D

The mission of the Radio Defense Corps of the German Wehrmacht was primarily that of determining by technical signal communication means, the location of the radio stations of enemy (Allied) agents situated and operating within the Reich or Axis-dominated territories. It also exercised certain secondary functions following upon the capture of such stations. In all these respects its operations differed in considerable degree from those employed by the German Signal Intelligence Services, which operated essentially against military forces of the Allies engaged in assault, first, upon "Fortress Europe", and, finally, the German Reich itself. While both services employed, in the main, identical equipment, and the personnel of all enjoyed the same basic technical training, techniques of the Radio Defense Corps, because of the comparatively close-range nature of its operations, were the more precise and refined.

The summary study of the German Radio Defense Corps, which follows, was prepared during the days shortly following the capitulation by Wilhelm Kelch, recently Captain of the German Army, and one of the most significant members of the Corps. Reference is made to his biography which is to be found in Vol. II. In justice to the author it must be stated that he compiled the study entirely from memory and without reference to official records or even personal notes, all of which were lost to him in the final days.

J. G. SEADOURNE
Colonel, Air Corps,
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RADIO DEFENSE CORPS (FUNKABWEHR)

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RADIO DEFENSE CORPS (FUNKABWEHR)

By Captain Wilhelm Kelch,
Radio Defense Corps, German Army.

I. Most Important Points in the Field of Radio Defense.

The Radio Defense Corps of the OKW (Oberkommando der Wehrmacht) was given the task of picking up and locating by D/F, transmitters of secret agents, and other clandestine transmitters. An underground transmitter is a secret radio station set up in enemy-occupied territory. Such a station is charged with passing back to its control station information of a military, political, or war-industrial nature obtained through espionage. This facilitates the carrying out of "pick-up missions" and "mail pick-up missions". Underground transmitter stations also pass traffic relative to the administration and supply of the secret organizations and resistance groups. An underground transmitter is usually one of several belonging to a more or less large espionage organization. The success of the invasion depended just as much on the work of these secret agents and the resistance groups they worked with as it did on all subsequent operations of a purely military nature. Without the service of the underground transmitting stations the building up of espionage and resistance groups in the West would not have been possible. And this might have led to a failure of the invasion. At any rate the losses actually sustained by the invasion troops would have been multiplied many times over.

By a "clandestine transmitter" is meant an amateur transmitting station whose operator does not possess a transmitting license. The moment a clandestine transmitter sends treasonable traffic it becomes an underground station.

A certain method of spotting secret agent and clandestine traffic according to radio intercept procedure, and fishing it out of the mass of regular traffic, is only possible when every intercept operator, or at

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least every analysis station, has access to a spectrum table of all known radio traffic. It is the duty of the Radio Defense Corps to build up this spectrum table of recognized traffic by working it out with all the organizations concerned. When all unaccounted-for traffic has been D/F'ed, the underground stations must be found out. The D/F-ing of underground and clandestine transmitters must be so accurate that on the basis of these bearings alone the station is located and extirpated. By D/F and Radio Intelligence methods of establishing who operates in the net, it can be determined what espionage cover-organization each transmitter belongs to. By deciphering intercepted traffic of a given station before its extirpation, the following things must be done by the radio defense interceptor:

- a) Know as much as possible about the personnel and circle of acquaintances of the underground agent-organization, and in order to determine counter measures, it must be established what plans, military matters, and pieces of equipment have been compromised.
- b) This facilitates the subsequent technical and criminological interrogation of the agent.

By rough D/F-ing of the underground transmitters, the following can be done:

- a) Areas of greatest espionage activity determined, because from these can be concluded areas of intended intense military activity.
- b) The plans made for subsequent close-range field work for the purpose of extirpating and rendering inoperative.

In the event that a so-called G-V Game was to be carried out, the Radio Defense Corps conducted the technical execution, while the information to be contained in the messages was furnished by the head office of the Reich Security, or the Military High Command. To carry out a G-V Game means to

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have an enemy agent, after his capture, continue operations under the direction of the Power against which he had been previously operating. The fact that he is doing this must not become known to his original organization. If this G-V Game is well carried out, it is possible to enter so deeply into the organization the agent belongs to that eventually the whole thing can be broken wide open. The espionage material that thus falls into the wrong hands in the course of a good G-V Game, material originating in the espionage headquarters, enables conclusions to be drawn about future military operations.

G-V Games can in general only be carried out when:

- a) the agent is thoroughly sold on working for you;
- b) organization and technique of the secret organization the station belongs to is known;
- c) the removal of the agent is either not known, or the circle of persons who know of it, and are able to give the control station word of the circumstance, are captured;
- d) special procedures, ciphers, and all security measures in the nature of W/T procedure or ciphers for protection against a G-V Game, are known.

The German Radio Defense Corps was only a very small organization compared to the numbers of spies and members of resistance movements working for the other side. The great successes of the Radio Defense Corps can be credited to well thought-out and well carried-out methods of work.

The Radio Defense Corps developed out of the H-Dienst (SIS). It was an independent organization, whose head office was the department OKW/WNV/Fu. (See Annex 1). The group Fu.-I worked principally on personnel and organizational questions. Fu.-II handled technical supply and development of

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equipment, as well as motor transport; and Fu.-III was the central clearing-house for the analysis of underground transmissions. In the last weeks of the war the office "Chief of Signals Monitoring, OKW" developed out of Fu.-III. Under the Chief of Signals Monitoring there were the following units:

- a) The I Signals Monitoring Battalion, which operated principally in Denmark, Holland, Belgium, France and Western Germany;
- b) The II Signals Monitoring Battalion. This outfit covered Norway, Poland, Russia, the Balkans and North Italy;
- c) Smaller outfits which were under direct command of the Chief of Signals Monitoring (such as small units in Spain).

Each battalion consisted of two signals monitoring companies, excluding the last days of the war. The battalion in the West had one company working on HF and another working VHF. Both companies of the II Battalion worked HF. Until the formation of the Signals Monitoring Battalion Staffs, there were two forward control stations under the department OKW/WNV/Fu. One was in Paris, the second in Vienna. Several out-stations were under each forward control station, and these were located in Oslo, Brussels, Lyons, Belgrad, Rome and Warsaw. For special details from time to time, the so-called special intercept units were set up directly under the Abtlg. Fu. All departments and branches of the Radio Defense Service, except the special intercept units, had to work in closest touch with Abtlg. III West, the Security Service, the Public Safety Police, and the Secret Field Police. Cooperation with Abtlg. III F West was in general good, but this office lacked the necessary power to act, which only the Security Service, and to a certain extent the Secret Field Police actually had. Cooperation with the Security Service

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and the Secret Field Police would have been very profitable by reason of their experiences in dealing with criminals, if it hadn't been for the arrogance of the officials, particularly in the Security Service, and their desire always to do everything themselves, even when they had no experience in the field of radio defense, all of which gave rise to notable friction.

The inhuman cruelty exercised by the Security Service, quite apart from the point of humanity, made it often impossible to carry out a successful G-V Game. The agent talked under duress, but was no longer in any psychological condition to go to work for a German station.

Until the Italian capitulation an attempt was made to carry out a close cooperation with the Italian Radio Defense Corps. This attempt failed on account of the mutual distrust which the Italians brought about largely themselves. The Italian Radio Defense Corps was in its infancy. So even if its work hadn't been interfered with by directives from higher Italian Headquarters, which was the case, it still would have been of very little use to us.

Every unit of the Radio Defense Corps devoted to HF and VHF interception has to be allocated a given sector, in which it alone does the close-range work. For long-range D/F and interception it must cooperate closely with all other Radio Defense units. This cooperation is required due to the fact that all intercepts and long-range bearings are fed in to a central clearing house for analysis and evaluation, which in turn assigns to whichever unit is in the area, the stations it is to work on at close-range. The most important technical work in radio defense is in the close-range and very close-range fields. Here the technical ability of the operators, the equipment and vehicles

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of the short-range D/F platoon, and an ever changing and superior camouflage, are all equally important contributing factors to success. A VHF monitoring company can operate entirely independently in its own area, because the conditions of wave-propagation of VHF are so basically different. A VHF company differs completely in organization, equipment, and operation from an HF monitoring company.

In the West the following secret agencies were known to us:

- a) American Secret Service;
- b) British Intelligence Service;
- c) French Secret Service of General de Gaulle;
- d) French Secret Service of General Giraud;
- e) Polish Secret Service (under British direction);
- f) Polish Secret Service (under Russian direction);
- g) Belgium and French Secret Service (under British and American direction);
- h) Dutch Secret Service (under British and American direction);
- i) Russian Secret Service.

In Italy as far as I know there were only the American, Russian, and British Secret Services. So for example there was a Russian agent chain between Rome and Moscow which the German Radio Defense, who revealed this fact to the Italians, was forbidden by the latter's Radio Defense Corps to take action against to remove them. It appeared that here there was no longer question of a mere chain of agents, but rather, as was assumed by the Germans, it looked as if this chain were fostered by high military and political circles.

The agents mostly came from the countries they were sent to operate in. The brains behind the organizations were Englishmen, Americans, Russians,

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and Poles, who however either never set foot in the countries their men worked in, or only went there on flying visits. The personal liaison between the headquarters and the local leaders of the operating spy-rings was brought about as much as possible by means of "Pick-ups", where the leader in question would be taken off to England or North Africa for a conference.

The most successful were the Polish and British services, from what could be gathered. The American service got better as the war progressed than it was in the beginning, but it must be remembered that it was a new organization compared with the Polish and British. The Russian Intelligence Service was on the whole bad. They operated on a colossal scale. I remember seeing in an intelligence bulletin put out by Section OKW/WNV/Fu. that towards the end of the war there were 30,000 agents, mostly prisoners and turncoats, who were undergoing training. Of course this number included other kinds of agents besides radio specialists.

Improvements in the technique of short wave^(HF) agent radio traffic could be accomplished as follows:

- a) camouflage the traffic as an authorized traffic of the country in which the agent is operating;
- b) frequent change of frequency and time of sending;
- c) frequent change of position.

The American and British Intelligence Services made the following mistakes in the field of VHF secret agent radio communication:

- a) VHF transmitters with a frequency band of 6 - 12 meters were used too early. This kind of transmitter, as it is easily spotted and removed

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by technical means, should only be used when the front has moved very near its position, or vice versa, and a sure and rapid means of communication is needed in keeping up with the rapidly changing military situation. Even when such a transmitter is spotted technically and removed, being in such a position, it is no longer a notable victory on the part of the other side to have captured it.

- b) The agent control station working from an aircraft talked almost exclusively on the same frequency as the agent station. Therefore not a single word was missed. Two frequencies should have been used.
- c) Reports were often sent in the clear, and administrative questions were discussed quite openly.
- d) The agents worked with too high an energy level, and could be picked up and D/F'ed from much too great a distance by permanent ground receiving installations. The agents to some extent possessed too little technical ability. Often for this reason no communication was accomplished or the traffic became too long drawn out. Many times our own receiving stations, far away from the control station, had copied the text long since, while the agent, because he had his antenna wrongly adjusted and didn't know how to use the set, was forced to ask for a repeat.

All captured operators of VHF underground stations agreed on one matter upon interrogation, to wit, that in England it was taken for granted that VHF transmitters could not be spotted and removed by technical means. The speaker from a control station announced once in the Dutch language "The Germans hear it all right, but they don't understand it."

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If VHF agent transmitters had operated with the least possible output level, and on wave lengths above three meters, preferably decimeter waves, we would not have been able to listen in, spot, and capture the stations due to a lack of the proper receivers, and because of the conditions of wave propagation which would have made it hard for us to effect interception. So, luck was with us.

A spy-ring must be so organized that no member could participate in a G-V Game without the control station possessing means of finding it out, or checking it from another source. In this way deliveries for months on end of weapons by the spy headquarters and resistance movements stationed in England into the hands of the German Security Service would have been stopped; personalities from these headquarters being ordered or coaxed right into German hands would have been saved; and military secrets spared from compromise. I believe that in some instances the enemy knew that a G-V game was in progress, but for various reasons decided to continue keeping the channel open.

From January 1945 on, I carried out an especially intensive coverage of tactical VHF traffic in the Colmar bridgehead area. As this operation was very successful, Col. Kopp, brigade commander for the West was ordered by higher headquarters to set up operations according to our proven methods on a large scale along the whole western front. The rapid military developments, so unfavorable for us, hindered this however.

The French had by far the worst R/T discipline. I was able, in the case of the three biggest attacks on this bridgehead, to report to the German

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Army Headquarters the day before they started, in part, the time, direction, and approximate strength of the attacks. By means of exact Direction Finding, tactical VHF transmitters were several times successfully knocked out by artillery fire, as far as the ammunition shortage of the German artillery permitted.

II. Evolution and Development of Radio Defense Corps
(See Annex 1)

a) Office of the "Chief of Signals Monitoring OKW"

The office "Chief of Signals Monitoring OKW" was created two months before the end of the war. It stemmed from the Group OKW/WNV/Fu. While the Radio Defense units of the Army up to this time were under OKW/WNV/Fu. only operationally, but were always under the nearest Signal Corps Staff administratively, now they were operationally and administratively under the Chief of Signals Monitoring. He had the position of a regimental commander. His headquarters were in Zinna near Jüterbog, southwest of Berlin.

b) Secret Agent Transmission Analysis and Evaluation, Section
OKW/WNV/Fu. III. (See Annex 2)

When the Signals Monitoring Regiment was activated, the Analysis and Evaluation section for Secret Agent Transmissions was taken over into the regimental staff of the Chief of Signals Monitoring. The departments working on HF were as follows:

D/F plotting and evaluation; sections for plotting the various agent nets; a section for unknown traffic; a section for handling clandestine transmitters; cryptographic analysis; VHF evaluation; Fieseler-Storch missions, contents

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evaluation; and final analysis.

Although between the regiment and the companies or intercept stations, the battalion staffs were interposed as intermediary, the companies and intercept stations reported all D/F bearings and intercepts by teletype directly to the regiment. The D/F plotting and evaluation section made a central plotting of all bearings regardless of the net the stations belonged in. As the Radio Defense Corps had to take D/F bearings at great distances, the errors in maps effected accuracy to some degree. In order to do away with these errors, the exact locations, or triangles of error, were calculated by the trigonometric procedure developed by Dr. Dürminger.

Every day the data for the next day were sent out by teletype to the subordinate units. The data consisted of frequencies, call-signs, expected times of transmissions, and any other particulars about the anticipated enemy traffic. Also included were the D/F bearing shots and the different fixes, which were determined from the D/F bearings supplied by all the D/F stations.

Besides, the men who worked on the nets put out roster supplements. Therein was worked out the most advantageous possible allocation of frequencies for the different units to cover. The D/F plotting section handled the D/F assignments in the roster supplement. In this way the D/F stations who were in the best geographic and technical position to take bearings on a given transmitter were assigned the job and could be checked as to whether they had accomplished it.

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All matters pertaining to clandestine traffic were worked on by a section which had no particular subsection in charge of analysis. The technical spotting and removal of clandestine transmitters was the work of the Public Safety Police.

My company shortly after activation was assigned for reasons of practice to spot and eliminate a clandestine transmitter in Silesia. (This work was carried out from Breslau-Brockau). The elimination of clandestine transmitters is particularly difficult, because these amateur stations operating without a license send traffic without any plan.

The most developed section was the one which worked on unknown radio traffic. It was considered the most important. On its work/^{depended} whether underground nets, which were operating with new traffic characteristics and new methods, would be spotted, or, as the case might be, spotted in time.

The volume of unknown traffic was very large. A card index alone was not enough to handle it. IBM machines were successfully used to take care of this problem. The section of unknown traffic had to work in close cooperation with all other organizations who concerned themselves with radio matters.

Deciphering and contents evaluation had conspicuous success. But a deciphering of the underground messages was almost always possible only when the code had been betrayed. Final analysts had the duty of:

1. Furnishing the High Command with as much information as possible on military, war-industrial, and political matters, passed by secret agent

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transmitters.

2. Providing guidance for the work of subordinate units, and after clearing with the other offices involved, assigning to subordinate units the transmitters to be eliminated. All D/F'ed stations were not to be eliminated. It was sometimes more important to read the traffic than to eliminate the transmitter.

Working in conjunction with the Fieseler-Storch mission section in the dispatching of aircraft on D/F missions.

Every month the Final Analysis section put out a top secret situation report of the Radio Defense Corps. In the last period of the war this report was divided for security reasons into a report on the East and a report on the West.

c) Signals Monitoring Battalions

From the older Forward Control stations of OKW/WNV/Fu. the Signals Monitoring Battalion staffs were formed, shortly before the office "Chief of Signals Monitoring". The battalion staffs were directly under OKW/WNV/Fu. After the Signals Monitoring Regiment was formed these were placed directly under it. The detachments under the battalion operating in the East were mostly Air Force units, and under the one in the West were chiefly Army units. The creation of the Signals Monitoring Battalions made things easier for the field units. While up to that time operational orders came through OKW/WNV/Fu., or the forward control stations or the out-stations, as the case might be, and the administrative orders came from some other headquarters, both now originated from the same source.

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a) Forward Control Stations and Out-stations of OKW/WNV/Fu.

The forward control stations had their sites in Paris and Athens. Later the Forward Control Station East transferred from Athens to Vienna. Out-stations and liaison officers were under the Forward Control Stations. They had their own deciphering section and a small evaluation section. Their principal duty was to maintain liaison with all other relevant headquarters and carry out interrogations.

e) Special Intercept Stations.

A special intercept station (Sonderhorchstelle) was an independent unit put in the field by the Radio Defense Corps. Shortly before the end of the war an attempt was made to take the intercept stations away from the companies, and divide the Radio Defense Units into intercept and long-range D/F companies on the one hand, and close-range D/F companies on the other. This plan originated with theorists who did not have enough practical experience. Experiments in this direction ended in complete failure.

f) The VHF Signals Monitoring Company.

Out of signals monitoring platoon 615, which later became 1st company, 1st Signal Monitoring Battalion, there was built up the only VHF monitoring company of the Radio Defense Corps. The platoon was increased for this purpose from 106 to 150 Men.

g) The HF Signals Monitoring Company.

The first Signals Monitoring Company was built from an intercept company. How difficult such a transformation can be is seen from the fact that from the beginning of the new set up until the first secret agent transmitter

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was eliminated about half a year went by. An H/F Signals Monitoring Company had a strength up to 400 men. Reserve unit for all Radio operators was the Signals Intelligence Replacement Battalion, and for all linguists the Signals Linguist Reserve and Training Battalion.

III. Cooperation with other Organizations.

a) Security Service and Secret Field Police.

As the Radio Defense Corps had no executive powers, the "extirpations", interrogations and G-V games had to be carried out by the Security Service or the Secret Field Police. (In cases of emergency the D/F troops were permitted to eliminate the transmitter personally as well as carry out the necessary searching of houses). In all cases the Radio Defense Corps was represented to make sure of the technical side of the process. The Radio Defense Corps had liaison officers in the particularly important stations of the Security Service. In the special section "Armée Secrète" in Marseilles the interests of the Radio Defense Corps were represented by an outstation.

b) Abwehr III F. West

The Defense (Abwehr) Units, later called Front Intelligence Units, were not entrusted with executive powers, anymore than the Radio Defense Corps. They were responsible for steps taken in all cases in which the "extirpation" of German stations or personnel thereof were involved.

For the further clarification of important cases, liaison personnel from the Defense Units were assigned to the units in question. (By the term "Liaison Personnel" is meant the spies who were assigned from the Defense Units). The I Signals Monitoring Battalion was represented in III F West, commanded by Lt.Col. Reile, by a liaison officer. Lt.Col. Reile was stationed with the Commander in Chief, West.

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c) Signal Intelligence Service (H-Dienst)

The H-Dienst supported the Radio Defense Corps in certain respects, such as additional D/F bearings being taken by D/F stations of the Army and Luftwaffe, and also in the matter of advising the Radio Defense Corps of suspicious traffic picked up and D/F'ed in areas occupied by German troops.

d) Public Safety Police

Under the command of the radio control station of the Public Safety Police there was a small signals monitoring unit of the Police. Its performance was generally poor; as it was backed up in every way possible by the Reich Security Head Office, there was perpetual friction here. Typical of the limited background of the Radio Defense Branch of the Police was an expedition undertaken with close-range D/F troops for the purpose of eliminating a VHF agent control station, which they thought was a secret ground installation in Holland, when it was in reality an airborne control. As the Police Radio Defense people made a point of concealing their activities as much as possible from the Radio Defense Corps, it sometimes happened that close-range D/F troops of the Army eliminated transmitter stations which were engaging in a G-V Game for the Public Safety Police. The results of this way of doing business were the following:

1. It was no longer possible to continue the G-V Game;
2. Waste of time, equipment, and personnel on the part of the Wehrmacht.

e) The Italian Radio Defense Corps

The Italian Radio Defense Corps was an organization which was entirely static from the point of view of development. Its staff included several

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high ranking officers. They sent a liaison officer to the Rome out-station of OKH/WNV/Fu., a certain Lt. Renzi. I always suspected that the Italian Radio Defense Corps purposely pretended to know far less than it really did. Coöperation with the Italians was extremely bad. They held up for weeks on end, always for new reasons, the setting up of a German Long-Range D/F in Rimini, had me arrested in La Spezia, delayed the clearances necessary for close-range D/F operations, and only permitted us to obtain a very small amount of information about their methods of operation. Close-range operations in Italy usually terminated with our discovery that the transmitter we were looking for was in a Post belonging to one of the Italian Armed Forces. The commanding officer of the Italian Radio Defense Station in Ajaccio (Corseica) with whom I had coöperated without a hitch, was soon afterward removed from his post.

IV. Operation and Technique of a VHF Signals Monitoring Company.

a) General Operations of a Company (See Annex 3)

The VHF Signals Monitoring Company differed in operation and technique from the HF Signals Monitoring Company, because VHF wave are propagated differently from HF waves. The existence of a sky-wave is quite irrelevant to the problems of interception and D/F in the case of VHF, because the work concerns itself exclusively with the quasi-optical waves which radiate from the source according to line-of-sight. By VHF is meant waves between 1 and 12 meters, although technically the term applies to waves between 1 and 10 meters. The reason is that in the case of secret agent transmitters the 10 meter limit was often passed by as much as 2 meters. In general it can be said of radio waves, that the shorter the wave radiating from the transmitter, the more closely its behaviour resembles that of a light wave in the matter of radiation.

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As there has to be a direct line of sight between the control station and secret-agent station, the following conditions can be expected in a VHF secret agent operation:

1. Immediate vicinity to the coast: Agent right on the coast or on a high point of land in the vicinity of the coast. Enemy control station on an island occupied by the enemy, or on board a ship.
2. Close to the Front: The breadth of the area along the front endangered by an agent using VHF is dependent on the elevation of the high points of land on both sides of the front, or at least on one side.
3. Up to 100 Km. distant from the area to which the enemy can generally send aircraft according to plan. From these considerations may be calculated the extent of the area to be covered by a Radio Defense Corps looking for VHF communication.

The building up of an intercept central with receivers of the same frequency band is not in order for the monitoring of agent traffic on VHF. The goal to be attained rather is the establishment of a large number of scattered intercept detachments. The more intercept personnel that are placed in operation, and the loftier their operational sites, the more certain it is that a secret agent's transmitter within the area of possible operations will be picked up as soon as it goes on the air. If the number of intercept troops is insufficient to cover the whole area in this fashion, one can still succeed with a smaller number if they change position every day.

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In order to achieve VHF reception from great distances, in regions where there are no favorable elevations, receivers may be attached to barrage balloons, or set up in slow flying aircraft. Bases for the close-range field D/F units were established in the areas suspected, or that proved to be concentration areas for espionage activity. It is evident, from the enormous area of operations, that a successful directing of the troops in the field can be accomplished only if good communications facilities are available. Radio communications, especially in difficult situations, has proved the most satisfactory.

b) Intercept and Monitoring Stations.

The monitoring stations had the following duties:

1. To carry out general search service on R/T and W/T. When such traffic was picked up it was for them to determine whether it was secret agent traffic. In all situations in which it was not completely clear whether or not it was agent traffic, tape recordings were made of the traffic, and a linguist or W/T man copied it down.
2. Current watching of traffic known to be secret agent by reason of information given by the analysis section. Should a monitoring station hear not only the agent control station but the agent station itself, and the monitoring station had a D/F on hand, then it was to take bearings immediately. If there was no D/F available, then a vehicle with built-in receiver set out immediately on a search trip, to determine the general area of ground propagation of the agent's transmitter by checking signal strength and reception. In this way it was accomplished that, when a close-range D/F operation was to take place at the next scheduled time for traffic transmission by the agent,

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the D/F's would be already set up at points which would give them strong enough reception of the agent transmitter signal to achieve a D/F bearing.

The VHF intercept stations used the following equipment:

1. 2 Radio Intercept Receivers (Type V);
2. 1 S.A.D.I.R. VHF - D/F receiver;
3. One each of the between-band receivers "Fanō" and "Samos" (These receivers could be switched on FM or AM. They were too scarce to give to all troops);
4. VHF receivers, captured from eliminated agent stations (In the course of time all units were equipped with these);
5. Recording device to take down R/T;
6. HF transmitter for handling messages to company headquarters;
7. Additional auxiliary equipment.

Each team consisted of a team leader, who was a W/T operator and message center man as well, 3 linguists, and 3 intercept operators.

The intercept operators carried out general search with an intercept receiver "V", a "Fanō" or a "Samos". The linguists listened to already spotted and scheduled R/T traffic, and kept logsheets of the text of R/T picked up by the intercept operators on search.

If the R/T traffic was blurred, it was often possible to pick it up with a captured VHF receiver. But this type of receiver could not be used for regular search, because after a short time the instrument got too hot, and would thus become damaged.

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Every monitoring team reported to its higher headquarters important parts of the tuning and testing traffic, as well as all messages between control stations and agent stations, giving signal strength and any additional, pertinent remarks (trips made in intercept vehicle and D/F bearings). This information was passed to the company analysis and evaluation section by teletype or W/T. The rolls of recording tape with recordings of traffic on them were sent to the company by courier for evaluation. The Analysis and Evaluation section passed back to the monitoring troops the intelligence they derived from the mass of traffic sent in to them. The success of the VHF monitoring troops depended largely on the quality of the antenna installations.

c) Close-Range D/F Platoons (See Annex 4)

1. Organization.

A VHF close-range D/F platoon consisted of:

- aa) Two or three D/F teams equipped with VHF D/F sets, Type "D", also an HF set;
- bb) Three or four motorized intercept and very close-range D/F teams equipped with VHF intercept receivers and very close-range D/F sets (Belt and Suit-Case types), also an HF set;
- cc) An intercept team which was equipped with intercept receivers and an H/F communications transmitter. The transmitter was used to pass information and orders to the D/F teams and other intercept teams in the field.

2. Equipment

The VHF D/F's (Type "D") were transportable sets, mounted on a vehicle. At the place from which one was to be operated it was taken off the vehicle

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and set up on the ground. The D/F-ing was done by means of dipoles. From a good operational site the equipment located a transmitter to within one kilometer at a distance of sixty kilometers. The motorized very close-range D/F troops were equipped with VHF intercept receivers (Type "V"), and for very close-range D/F work they used belt D/F's, and different kinds of "suit-case" D/F's. Belt D/F's are made as follows:

The actual D/F is a small, flat apparatus which can be worn as a belt under a jacket or coat without being noticed. The power supply is so small that it can be carried in the trousers pocket, whence a power cable leads to the D/F. The D/F antenna consists of a thick, rubber insulated cable. This comes out of the D/F apparatus along the right hip of the D/F man, passes under his right arm and over the back of his neck, then under his left arm, down to the left hip. A thin flesh-colored wire leads to a small earphone stuck in one ear like a hearing aid. Operations with the belt D/F apparatus can only be carried out in the case of distances under 400 meters. Only direction can be determined, but it cannot be sensed (resulting in a possible 180° error).

The "suit-case" D/F resembles the one used in very close-range HF D/F work. The ideal instrument was one developed by the VHF signals monitoring company. It was constructed as follows:

The instrument was in a box that looked like the kit of a locksmith. The shoulder strap, with a wire running through it, served as D/F antenna. The D/F operation could be carried out even more inconspicuously than with the former equipment, because the D/F man did not have to turn his face in the direction of the transmitter. The null he was seeking was no longer

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in front or in back of him, but right and left. In the box there were two receivers, one to listen to the control station, the other to hear the agent station. In this manner the D/F man could switch back and forth between agent and control with one hand, and could easily determine at any given time whether he was unable to hear the agent station for the reason that the control was transmitting, or whether the agent was transmitting and he could not hear him because he was too far away.

Every team of the close-range D/F platoon had an HF transmitter, with which communications could be maintained between members of the platoon operating in the field (Army Transmitter, 15 watt). Each intercept team also had a transmitter. These were always captured HF agent sets obtained in the course of elimination of stations.

3. Operation of Intercept Search Teams.

If it could be determined from the traffic of a VHF agent control station, which could be heard over a large area, that a VHF agent transmitter had turned up which had not yet been D/F'ed, the first problem was to pick up this agent on a receiver. In other words, to find the area around the agent transmitter where it could be heard from the ground. To find this "ground wave area" three or four intercept search teams were used. These had the assignment of searching by radio intelligence means all through the area in question, according to a predetermined plan, during the times when the agent was scheduled to be on the air. The leaders of the teams that reached the close vicinity marked on a map the stretches of road on which the agent was heard in the cars. Then they were to turn around and leave, and not come into the very close-range area of the station. Operating with intercept search teams initially was necessary,

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because in contrast to HF operations the position of the area surrounding the transmitter could not be found out by long-range D/F. The HF D/F can be set up in the area of reception of the sky wave, which is of course impossible with VHF.

4. Operation of the VHF. D/F (Type "D")

By the time the transmitter was scheduled next to be on the air, VHF D/F "D" sets had been set up in the area in which the intercept search teams had picked up the transmitter, in such a manner as to afford the best base line, VHF close-range D/F's could not be used, because they were not developed technically to a fine enough point. They worked without giving true direction (possible 180° error) and in addition to this they had a possible error up to 90°. Besides, VHF close-range D/F's were not important because the VHF D/F "D" was so accurate that on the basis of fixes obtained by them the very close-range D/F teams, working with belt and suit-case D/F's, could be put right on the job.

Immediately a bearing was secured, each D/F team reported it (by means of the HF transmitter) by W/T to all other D/F teams as well as intercept search teams. In the vicinity of every D/F (Type "D") an intercept search team was posted; another stood in readiness where the agent's transmitter was estimated to be. In order to accomplish results, the bearings taken had to be exchanged by all stations within three (3) minutes after the agent began transmitting.

Intercept search teams which had to find the close proximity of the VHF agent transmitter were to bring the very close-range D/F (belt and suit-case D/F) men to their starting point for operation, and to give them support and aid at the beginning of their work by means of their intercept receivers.

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5. Very Close-Range Operation

The control station plotted the D/F bearings on an exact map. Then the intercept search teams moved from their different locations towards the point of intersection, or the triangle of error. Every vehicle of an intercept search troop had a very close-range D/F set. The moment that one of the intercept search teams discovered the immediate vicinity of the transmitter, a very close-range team got out of the car. The driver drove away, and established radio communication with the other intercept search teams. He informed them of the immediate vicinity of the transmitter. At this point the remaining search teams were to break off their own search and hold themselves in readiness.

In the VHF operation the "immediate vicinity" is understood to mean the area within which D/F with very close-range D/F apparatus is practicable. Generally this area is within a radius of 400 meters of the transmitter. A very close-range D/F team consisted of a D/F operator and a helper. Before operations it was their job to familiarize themselves with the details of the neighbourhood landscape where the operation was to take place. The helper had the following duties:

- aa) to be on the look-out for people watching the proceedings, suspicious persons, and antennas;
- bb) to protect the operation with his weapon.

Very close-range work-belt D/F sets and different kinds of suit-case D/F sets were used. The bicycle D/F consisted of a D/F antenna and intercept receiver (V) built into a bicycle in a concealed manner. The suit-case D/F was built into travelling bags, cardboard boxes, tool kits, or violin cases. With the help of these sets the very close-range team worked around the

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house the agent was in without drawing attention. In the case of larger houses, they could experiment in this way until they found the apartment.

If the agent betrayed by his traffic that he was suspicious of something untoward going on, then everybody who was suspect would be arrested under all circumstances. If the very close-range operation went off according to plan, then the elimination of the agent was carried out in whatever manner the Radio Defense Corps OKW and the Reich Security Service agreed on. A posse of the Security Service or of the secret Field Police was called by radio or messenger to be in readiness on the spot. They took over the actual arrest and house search.

The VHF intercept troops of the platoons were located near the agent transmitter during the very close-range D/F operation. They were to observe the exact course of the agent's traffic, and keep logs of all messages. As far as camouflage was concerned, the same requirements obtained as was described in the section on HF close-range field work.

The D/F men assigned to carry out the very close-range operations had to be familiar with the characteristics of various transmitting antennas, as well as certain phenomena of screening and reflection. If they were not familiar with these factors they might quite possibly D/F the wrong house. The three drawings following represent instances of screenings and reflection which often came up in very close-range D/F operations.

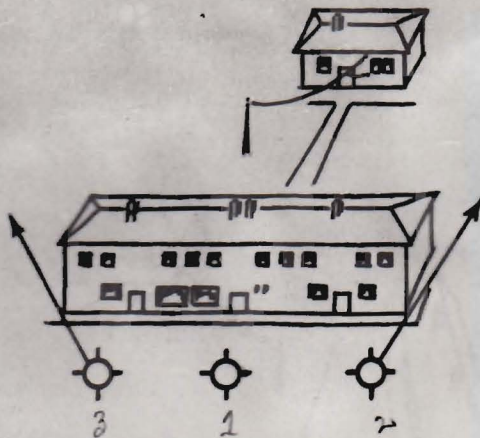
1st Example: A building which is between the transmitter and very close-range D/F, acts as a screen and as a deflector. In D/F position 1 no D/F

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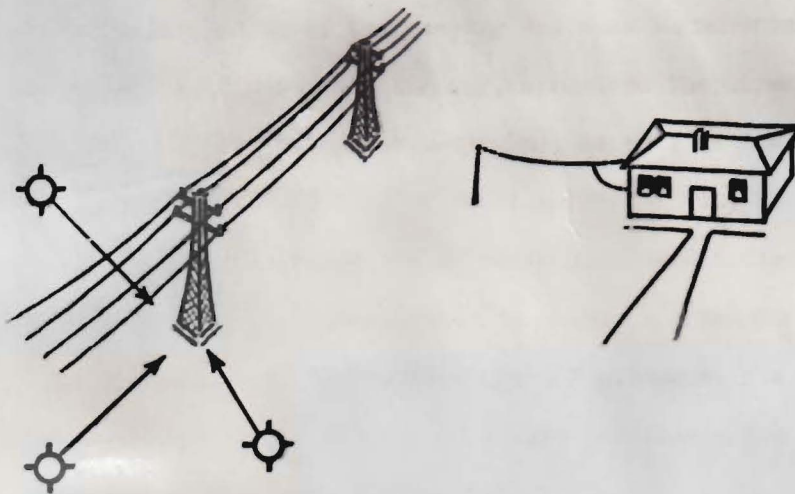
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is possible. In positions 2 and 3 the D/F points past the corners of the screening building, and in an erroneous direction.



2nd Example: The antenna of the secret agent's transmitter radiates in the direction of a telephone or power line with metal pylons. The very close-range D/F shoots bearings either along the wires or towards the metal pylons.

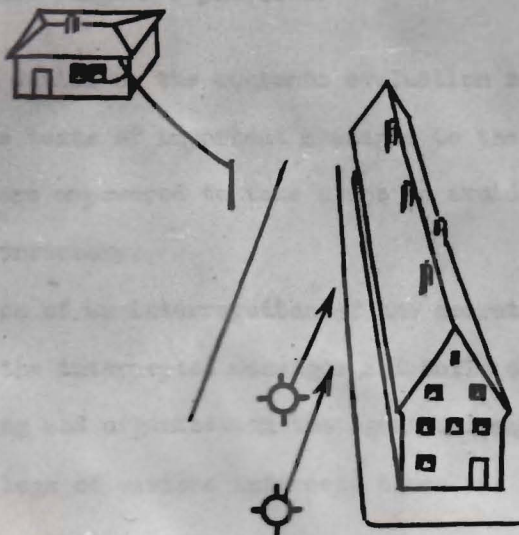


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3rd Example: The antenna of the transmitter radiates in the direction of a wall or the front of a house. The very close-range D/F points almost always to the point on the wall which would be reached by an imaginary prolongation of the direction of the antenna.



d) Signals Platoon

The signals platoon of the company was weak in numbers. It built the communications net inside the company, connected the direct lines to the next DV, HV, and LV. (telephone centrals), as well as the nearest Forward Control Station or Out-station of section OKW/WNV/Fu.; it also set up the company's telephone exchange. By HF radio links and indirect teletype lines it was also the task of this platoon to maintain communications between the intercept teams and the close-range D/F platoons. The installation of teletype and telephone lines was no longer possible a few days after the Invasion, due to bomb damage and sabotage.

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e) Analysis and Evaluation

Evaluation was organized:

- aa) into traffic analysis and evaluation;
- bb) into deciphering and contents evaluation.

There was no D/F evaluation section, because the D/F bearings had to be plotted by the close-range D/F platoons.

The principal duties of the contents evaluation section were:

- aa) to pass on the texts of important messages to the offices in such headquarters as were empowered to take steps to avoid the consequences of the proven treachery.
- bb) in anticipation of an interrogation of the secret agent, to collect and organize all the intercepted messages and build up a picture from them of the spy-ring and organization the agent belonged to.
- cc) By comparing logs of various intercept teams and tape recordings, to clear up errors in the logs.

f) Balloon Operation

In order to pick up a VHF transmitter as quickly as possible by intercept methods in country where natural elevations were lacking, and a VHF agent could only be heard within a short distance, it became necessary to use captive balloons. In Holland, for example, where it was necessary to find up to 30 operational sites to be sure of picking up the agent with VHF, according to planned methods, one single captive balloon was all that was needed to achieve this end. In the course of our experiments along this line, which proved successful, we fastened an intercept receiver (V) to a captive balloon. This receiver was equipped with an autodyn motor which

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set the frequency according to controls on the ground which could be shut on or off. The staff antenna hung down free. The earphone cable was extended down to the ground. An amplifier was placed between, to step up the output to the earphones.

g) Fieseler Storch Operations

The work of the close-range Field D/F platoons should have been helped materially by the operation of an intercept set in a slow flying plane of the type of Fieseler Storch. Theoretically this would have been easily possible. But since the VHF agents were operating exclusively in an area where the enemy had air supremacy, the operation of these machines was practically impossible. An attempt resulted in the plane being shot down the first day.

h) Nightfighter Operations

By working together with the commanding officer of the Nightfighter Group at Florennes, Belgium, I tried to bring about the shooting down of the enemy airborne control stations that flew in at night. For this purpose VHF D/F sets ("D") were set up throughout northern France and Belgium, far apart from one another. These D/F stations had the mission of D/F-ing the VHF transmitter of the aircraft currently on its way in. The bearings obtained were passed on uninterruptedly to an evaluation station, which had been built for this purpose on the Cotentin peninsula. Here the bearings were plotted and crossed, and the fixes passed on in the form of squares on the Fighter Grid to the controller of the Nightfighter Group. He directed the nightfighters he had in the air towards the plane with the agent control station, on the basis of the fixes passed to him. From there on it was up to the nightfighter to do the work with his own nightfighter device. Whether we shot down an airborne agent control in the neighbourhood

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of Poix, or whether it was another plane, is not known to us. Once when the nightfighter in question shot down a plane in the Poix area, we noticed that from that moment on the agent control station was silent.

V. Operation and Technique of a HF Monitoring Company

a) General Disposition of the Company (See Annex 5a and 5b)

Every HF Signals Monitoring Unit had two operational sites, in the days of its greatest success. The purpose of this step was that one site would receive signals from an area with respect to which the other site lay in a "dead zone".

The intercept stations of the HF unit working in Italy were set up in Ladispoli near Rome, and on Monte Pellegrino near Palermo. The 616th Signals Monitoring Company, later called the 2nd Company, 1st Signals Monitoring Battalion, had its intercept stations in Fuhrberg near Hannover, and in Giessen, Brussels, Petite Espinette. The intercept station in Brussels was moved later to Bois le Roi, near Melun.

The long-range D/F's were always widely spread out. In Italy there was one each in Rimini, Cagliari (Sardinia) Ladispoli near Rome, and Marsalla (Sicily). The long-range D/F's of the 2nd Company had their sites in Toulouse, Brest, Hannover, and Langenargen on Lake Constance. Whether or not there was another D/F in Locken, South Denmark, I do not know for sure.

The close-range D/F platoons carried out their assigned missions in their areas from so-called close-range field bases (Nahfeldstützpunkte). These bases were centrally located in the assigned area. The supply of the

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platoons was carried out through these bases. The bases could mostly be reached by direct telephone line. Radio communication was available in case of a breakdown.

b) Monitoring Stations

The division of duties in an intercept or monitoring station was as follows:

Some intercept teams had the mission of clarifying suspicious traffic which hadn't yet been spotted through radio intelligence channels. Another group had orders to intercept and process traffic which the "unknown traffic" branch of the Analysis Section OKW/WNV/Fu., considered to be especially suspicious. On the basis of this systematic coverage these suspicious communications were either declared harmless and the coverage dropped, or the coverage passed on to the intercept team whose mission it was to cover the net to which the now-explained traffic belonged. The third group covered the traffic which had been identified as to net, or had been partially clarified. For this task the less proficient intercept operators were used. Every intercept team engaged in general search work had on hand a book containing a summary of all known radio traffic.

The intercept station directed the long-range D/F and the close-range D/F platoons with two Peilkommando transmitters (D/F command net used to order D/F units on a given frequency and call-sign.)

There follows a description of a long-range D/F command net set up:

1. Use of Land Lines

Next to each receiver was a microphone and a push button. When an intercept operator had a D/F command to transmit, he pressed a button,

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which lit a red lamp that all intercept operators could see. This meant that the D/F command net was in use at the time. Then the operator gave frequency, call-sign, and any identifying characteristics, over a party line to which all long-range D/F teams were connected. If the traffic to be D/F'ed was coming in loud enough the operator could have it transmitted along the party line. When he had checked with the D/F men and established the fact that those who could D/F the traffic had done so, he ended by giving over the wire the exact time and the serial number of this particular D/F assignment. The process just described could only be interrupted by a so-called "Blitzkommando". Blitzkommando meant that the D/F command net was needed for the carrying out of a close-range D/F operation.

2. Use of Radio Communications

When it was no longer possible to direct long-range D/F by land-line, this was accomplished by radio. In principle the method is the same. It proved abundantly worth while to have the D/F command net give the D/F operators a running commentary on the traffic to be D/F'ed during the whole time of transmission, to advise them whether the transmitter to be D/F'ed was making a call, sending a procedure message, number or letter groups, or whether it had interrupted or broken off its transmission. In this way the D/F-ing of some other transmitter that might have just come in on the same frequency was avoided, along with the radical errors in D/F which would have resulted from such a circumstance. The intercept stations used a second transmitter which gave the close-range D/F teams in the field a running commentary on the agent traffic upon whose elimination they were engaged.

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c) Long-Range D/F Teams (HF)

The work of the long-range HF D/F men in the signals monitoring service did not differ from the work of the long-range D/F men of the H-Dienst. For purposes of Peilkommando (D/F center) communication by telephone, in every D/F station there was a loudspeaker with an amplifier. Peilkommando messages were picked up by a message center radio operator. Telefunken-Adcock sets were used for D/F sets.

d) Close-Range D/F Platoon (HF)

1. Organization

Close-Range HF D/F platoons were made up of three to six close-range D/F teams and one intercept team. The intercept team had to keep a watch on the frequency which was used for regular traffic by the transmitter to be eliminated. The purpose of this watch was to notify the close-range D/F teams the moment the agent began his radio traffic, even if it came up at some time contrary to the recognized regular schedule.

2. Equipment

The HF D/F teams for close-range work were each fitted out with a close-range D/F set made by the firm Kapsch of Vienna, an intercept receiver "C", and HF receiver "Radione" and an agent's transmitter captured in the course of operations. The very close-range D/F teams used belt D/F sets and suit-case D/F sets.

3. Operations of the Close-Range D/F Teams (HF)

If the approximate location of the agent transmitter was not established by the relatively inaccurate long-range D/F, as was usually the case, this approximation had to be found by search expeditions on the part of the close-range D/F teams. For this purpose the close-range D/F teams were set

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up at distant points throughout the area in question. One intercept operator in each team watched the frequency of the agent control station with the intercept receiver "C". If he could deduce from the type of traffic emanating from the control station, that the agent transmitter he was looking for was sending at the moment, then he went on search. In order to avoid having the control station as well as the agent station being hunted by the close-range D/F teams in the field, particularly in the case of a change of plan, a second radio operator was given the Feilkommando frequency to watch. This transmitter operated on a high output level and was directed from the out-station. It passed a running commentary on call-signs, frequencies, and messages sent by the agent transmitter being searched for.

All close-range D/F teams were to seek out the area in question concentrically according to an established plan. They were not supposed to deviate from the appointed course unless they could hear, or D/F, the transmitter they were after.

If a close-range D/F team heard the agent transmitter it had to determine first of all if it was hearing the ground wave (that is, the radiations in the near proximity) or the sky wave. If he established that he heard the agent transmitter steadily, that is, without fading, then he knew that he was in proximity. As the close-range HF D/F not only gives direction but also senses, the D/F team could then start working on the elimination of the transmitter by a further taking of bearings from different positions.

The D/F operator was required to fill out all data on a special form, and the team leader was to mark on an exact map the areas in which he heard

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shy wave or found the skip; also to note the bearings taken in the proximity and project them as lines. The individual close-range D/F teams operating had to inform each other by means of the HF transmitter of important data they discovered. When a team discovered the immediate vicinity of an enemy agent station, it notified the other teams of this fact. The purpose of this step was to avoid putting the agent to flight or to changing his position by the simultaneous appearance of a number of vehicles.

4. Operation of the very close-range D/F teams (HF)

If the D/F operators were not familiar with the conditions of the terrain of the immediate vicinity, and if this terrain could not be observed from a height, the operators had to orient themselves exactly before starting the very close-range D/F operation.

If there were just a few houses standing in the area, the one the agent was working from could often be spotted by just driving by with the close-range D/F van. In cities and thickly populated larger villages the use of belt D/F teams and suit-case D/F teams was indispensable.

5. Operation with transmitter-seeking devices.

Transmitter seeking devices were very insensitive receivers. With the help of an electric motor the frequency band was automatically searched. According to the quality of the antenna used, only those transmitters were picked up which were within a radius of 400 to 1000 meters distance. It was possible for the operator to establish frequency, operating schedule, and type of traffic, with this set, if he knew the approximate location of the transmitter, and kept constant watch. By making the antenna

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smaller and smaller it was possible in some cases to locate agent transmitters by the use of this set alone. In Italy I used such an apparatus to follow the Italian agent control traffic, for intelligence purposes, by setting it up near the Italian agent control station.

6. Fieseler Storch Operations

Operations with Fieseler Storch were carried out successfully in Norway and in the Balkans. The reason for their use there was that either the terrain could not be driven over by close-range D/F vans, or that there were too many partisans in the areas. D/F-ing with Fieseler Storch is executed not by flying over the position of the agent's transmitter, but around it.

7. Camouflage and Concealment

In almost every case there was associated with each enemy agent a group of persons whose job it was to watch for suspicious people and vehicles in the neighbourhood of the agent's transmitter. Besides, it became known to us that the underground organizations received constant information concerning the appearance and behavior of close-range D/F vans, as well as belt and suit-case D/F sets.

A successful close-range and especially very close-range operation was therefore impossible without an ever changing camouflage, suited to whatever surroundings the operation moved to. For these purposes the close-range D/F vans were frequently given a different coat of paint, the registration plates changed, the silhouette altered, and vehicles with gasoline engines had illuminating gas cylinders built on them for purposes of deception. The dress of the operators varied between civilian clothes and uniform. In fashionable sections of towns, smart clothes were worn,

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and work clothes in the worker quarters. The close-range D/F suit-case was always being given a different camouflage. If a vehicle had to stop in order to take an accurate bearing, a motor disorder or a flat tire was faked. The difficulties that one can become involved in by use of a fake appearance for camouflage can be illustrated by the following incident: My unit tried to drive a close-range D/F van disguised as a milk wagon through Naples. The vehicle had to leave Naples by the quickest possible route because crowds of hungry people stormed around the truck, wanting to buy milk.

e) Signals Platoon (See Annex 6)

The signals platoon of an HF signals monitoring company consisted of a telephone and a W/T squad. The telephone squad did the operating and trouble shooting of the telephone and teletype lines, as well as setting up the company telephone system and teletype installation. The W/T squad operated the Kommando transmitter.

f) Analysis and Evaluation

The analysis section was set up like the analysis section of OKW/WNV/Fu. There was lacking only the departments for Fieseler Storch operations, and for the nets which the company did not watch. The company analysis section was supposed to do the preliminary work for the analysis section of OKW/WNV/Fu. III. At given intervals a report of activity was drawn up for the next higher headquarters.

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VI. Interrogations by the Out-stations of OKW/WNV/Fu.

Authorized persons of the Radio Defense Corps were permitted to interrogate members of spy-rings and resistance movements, but only on technical matters. As technical questions could never be separated from others, and since interrogations of the Security Service were often insufficient, the Radio Defense Corps almost always carried out the rest of the interrogation as well as the technical features, in spite of the difficulties created by the Security Service, and the Secret Field Police. Of course each captured agent was also interrogated by the Security Service and the Secret Field Police. The interrogations covered the following complex of questions:

1. Personal questions
2. Political convictions
3. Military career
4. Why did subject become a spy? Idealistic or material grounds?
5. Who made him sign up?
6. Where was he trained?
7. How was he taken to the training site?
8. Who else took the training?
9. Who were the teachers?
10. In what branches of the Secret Service was he trained?
11. How was he brought to the site of operation?
12. To what persons was he introduced at the first place of operations?
13. What was his organization called?
14. What is the name of the chief of his organization and where does he live?
15. What does he know about mail boxes, couriers, courier points?
16. What members of the organization did he make acquaintance with during his activity as one of its members?

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17. What did these people do in the organization?
18. Did these persons have pseudonyms or not?
19. What pseudonyms did he himself have?
20. How were rendezvous arranged?
21. Where did they take place?
22. Were there authentication signals, and if so, what were they?
23. What was discussed at these rendezvous?
24. When and where was he to make the next rendezvous?
25. Does he believe that the rendezvous will be supervised by members of the organization?
26. What was he taught about the Radio Defense Corps in his training?
27. What did he learn about the Radio Defense Corps in the course of operations?
28. What precautions did he take against the work of the Radio Defense Corps?
29. Had he placed guards or armed persons to watch his site, and who were they?
30. What arms has he in his possession, and what arms stores does he know of?
31. Had he poison with him?
32. Had he alternate sites?
33. Which of these have already been used? Which did he still intend to use?
34. What circle of individuals was informed at each time?
35. Had his organization spies in German civilian or military organizations?
36. What does he know about the murder of Germans, or the kidnapping of Germans?

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37. What does he know about "pick ups", "mail pick ups", and supply dropping operations? Where, when? Ground crew?
38. Who organized these enterprises, and through what radio stations did the arrangements take place?
39. What sabotage had been carried out?
40. Where did the equipment come from to accomplish this?
41. What espionage material is still on hand? Where? Enciphered or in clear text?
42. What special missions had he been given?
43. How was he meant to behave politically, as a member of his organization, especially in regard to being approached for membership in other organizations?
44. In what sets did he receive instruction?
45. What sets does he possess?
46. Where are the sets?
47. Where were the storage batteries charged?
48. How, and through whom did he obtain spare parts, money, food?
49. What experiences had he concerning antennas, frequencies, sets?
50. Does he still possess a signal operating instruction?
51. If not, can he reconstruct it?
52. Does he possess cipher procedures or enciphered texts?
53. What ciphers and codes does he know about?
54. How did he receive his messages, enciphered or open?
55. When, where, through whom did he get them?
56. What precautions had been taken against G-V games being operated?
Were these precautions in the procedure, cipher technique, or text?

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57. Did he give his control station a sign that he was in danger? What sign?
58. Does he feel prepared to work for the Germans?
59. What steps had been taken for an eventual escape?
60. What passes had he? Who gave them, when, where?
61. What did he know about the use of VHF for secret agent transmitters?

Agents who had used VHF agent transmitters were asked the following questions in addition:

1. Who belonged to your team?
2. What do you know about the operations by the H/F transmitters belonging to your team?
3. What was said to you in the course of your training about the possibility of the Germans locating and listening in on VHF traffic?
4. Have you listened to VHF control stations while they worked with other VHF agent transmitters?

VII. Technical execution of G-V games

Insofar as possible the traffic in G-V games was carried out by the operator who had been on the station all along. This was only feasible when the impression obtained that the operator was honestly ready to do his part either through conviction or under pressure of circumstances. The operator could then either go on living freely near his work, and enjoy unrestricted movement (none the less he was shadowed) or he lived under supervision in a building belonging to the Radio Corps, the Security Service, or the Secret Field Police, or he was kept in jail. The operator was put up according to his character and the policy (or perspicacity) of the responsible officials.

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The traffic that ensued was closely watched by the intercept station. In the event that the operator was not working unguarded, a member of the Radio Defense Corps, who had to be a specialist in the traffic in question, supervised the operator's work on the spot. In this manner in case the operator tried anything radical it was possible to take immediate steps. It was carefully checked whether the operator persisted with the same "fist" as before.

A site must be selected for the transmitter not far removed from the previous site, in case a message from the agent to the control station explaining a move could not be sent without arousing suspicion. When the position had been changed without a message of explanation, the antenna installation must remain as much as possible like the previous one, so the control station wouldn't notice any changes in tone or signal strength.

The Radio Defense Corps was responsible for the maintenance of the sending schedule, and the proper sentence structure and enciphering of the messages. Messages given out for transmission by the Reich Security Office (Reichssicherheitsamt) or by military authorities had to be re-written and re-cast on the basis of radio intelligence observation of the traffic, and the technical interrogation of the agent.

In the event that the operator was killed in a shooting fight, or if he were in no condition to collaborate, then, if a G-V game still seemed in order, the operating was taken over by a member of the Radio Defense Corps. He had to imitate the former operator's "fist" with deceptive exactness.

As for the contents of the messages, it was attempted immediately after initiating the G-V game, to betray an actual piece of military information

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in order to be in a better position to give misleading information. It was always to be avoided that the control station should get the impression that there was a particular interest in carrying on the traffic. G-V games were discontinued when the control station asked long difficult questions of no particular interest, or when the control padded the traffic with unimportant news. The control station almost always tried to perpetuate a recognized G-V game by asking questions and transmitting unimportant texts.

VIII. Suggestions for the organization and technique of a Radio Defense Corps

The organization and technique of the German Radio Defense Corps was in general proper. The successful missions accomplished in all countries occupied by Germany, with relatively limited means, are proof enough of this.

The Radio Defense Corps must be an independent organization. Its highest echelon of command should be under an officer who is also in command of the Signal Intelligence Service. He must be able to delegate authority, to shift and exchange equipment, radio sets, motor vehicles, etc. between the Signal Intelligence Service and the Radio Defense Corps. The commanding officer of the reserve battalion must be under the Chief of Signals Intelligence and the senior Radio Defense Officer. In this manner it would be assured that training would be pertinent to actual practise later on.

In Germany the Radio Defense Corps and the Signals Intelligence Service were completely separate organizations. An example of how this worked out was that I had dozens of intercept receivers "V" standing idle in my unit, while some Signal Intelligence Regiments, as it now turns out, were unable to procure any of these sets, which they needed most urgently, despite the great pains they went to.

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There would have been operational advantages in a closer coöperation between Radio Defense Corps and the Signal Intelligence Service, which, without knowing that the Radio Defense Corps was doing the same thing in the same sector, covered the enemy tactical VHF frequencies in the southern part of the Western Front. But nobody was giving these frequencies proper coverage in the northern sector.

The clarification of much radio traffic would have been simpler for both parties, particularly for the Radio Defense Corps anyway, if there had been closer coöperation between the two services.

A complete fusion of Signal Intelligence and Radio Defense Corps however would not be ideal. The Radio Defense Corps is of necessity so different from Signal Intelligence in its techniques that in the event of a fusion one or the other would be at a disadvantage. It is true that the Signal Intelligence Service in the course of its ordinary business can take on the interception and initiate counter-measures against say 10 or 20 agent transmitters; but if hundreds of these should appear, then this would be impossible.

Every country that wants to save blood and equipment in the conduct of a war, must be generous with respect to the means and opportunities it places at the disposal of the Signal Intelligence Service and the Radio Defense Corps. In this respect the German Wehrmacht made mistakes. For example, the Radio Defense Corps OKW was an estimated 2500 men strong. An additional 500 men needed to man mobile D/F installations for the organization operating in the West, would have been adequate to render harmless a secret agent radio organization of the most modern type. But this

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addition to the forces was not approved, because the "combat troops" needed them. Perhaps on account of this the combat troops lost out on the Invasion, and consequently, the war.

In the German Radio Defense Corps the troops assigned to intercept and long-range D/F were sufficient in numbers. Those assigned to close-range D/F however too few. There were about 400 men in all for this assignment. In the West alone, 500 close-range D/F-men would have been needed. These would not have been over-burdened with work all the time, because the demands on the organization were not always equally great. This fact would have to be considered. The Radio Defense Corps must have perquisites and powers which are not even required by the Signal Intelligence Service. One step in this direction was taken in Germany in that every mobile D/F team possessed a true copy of an order from Hitler himself, as authority for carrying out their work. Among other things, this order stated approximately as follows: "Every post camp or station of the Armed Forces is obliged to assist members of the Radio Defense Corps in every way possible. Their mission has "Top Priority"."

The organization of the Analysis Section for Secret Agent Radio Traffic OKW/ONV/Fu. III was sound. Its turnout of "intelligence poop" and "intercept and D/F bulletins" worked out very well. This service can only be rendered by an analysis station that works for the whole Radio Defense Corps.

The department that carried out Fieseler Storch operations did not belong in section Fu. III. The Storch operations should have been handled by the forward control stations or the battalions, in conjunction with

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the Luftwaffe. I believe that the creation of a central office for Storch operations came about only in order to provide a job for a certain Major whose promotion had been accelerated for political reasons. The formation of a Radio Defense Regiment under the OKW was in order, likewise the formation of battalions, which in turn had companies and liaison officers subordinate to them. Operational and administrative control of Radio Defense Corps units must be in the same hands.

The reorganization of Radio Defense Corps units into intercept and long-range D/F units on the one hand, and close-range D/F units on the other, carried out in the last weeks of the war, was completely senseless. The intercept and long-range D/F branches of the Radio Defense Corps are so closely intertwined with the close-range D/F service that a separation into different units works to serious disadvantage.

As a result of new techniques developed by the British in their secret agent radio work during the last months of the war scarcely any eliminations on our part of agent stations followed immediately. This is not to be attributed to the excellence of the new British system, as was announced by the BBC in a broadcast shortly after the end of the war, but rather to the detrimental reorganization of the Radio Defense Corps mentioned above. This reorganization rendered the Radio Defense Corps clumsy. The former flexibility and adaptability were indispensable to an effective countering of the new British system.

Each unit of the Radio Defense Corps must be assigned a particular sector. At present, for instance, a company could be assigned Germany north of the Main River. This company must obviously be permitted to

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set up intercept stations and D/F's in France and Southern Germany. It alone should be responsible for close-range D/F operations within its assigned area.

Technical and criminological processing of eliminations by technical means must not be separated from one another. The Radio Defense Corps should be authorized to work on all criminological questions that have to do with secret transmitters and organizations operating them. By reason of the division of authority between Radio Defense Corps on one hand and Security Service and Secret Field Police on the other, much was missed in the evaluation of technical successes. The Radio Defense Corps must have executive police powers.

IX. Prerequisites for the operation of a G-V Game

A G-V game can only be operated if the following be true:

- a) The traffic must have been studied long enough by Radio Intelligence methods;
- b) Schedules, procedure, and codes and ciphers must be known;
- c) All technical precautions known that the enemy may use to prevent operation of a G-V Game;
- d) The agent is willing to collaborate;
- e) Either the operator must be fully informed about his organization, or the group of people who possess the necessary knowledge of the whole enemy organization must have been captured, and their knowledge extracted for operational use;
- f) The elimination of the secret station has not become known to persons still at large who have the means to notify the control station of this circumstance;

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- g) Too much time must not elapse between elimination and preparation for taking up the G-V game.

X. Organization and Technique of Secret Agent Organizations

Organization and technique of Secret Agent Organizations changed constantly and no one organization resembled another. As I have read a great number of PW interrogation reports in the course of time, I can no longer describe particular organizations from memory. Therefore I will put down only the characteristics of groups of organizations. The following refers to the most important ones:

Guidance consisted of the head of the organization, a secretary, and a few collaborators. The chief of the organization received orders from a headquarters located outside the area of German occupied territory. These headquarters communicated their orders to the organization leaders, subsections and individuals by means of:

- a) Broadcast messages of hidden meaning, such as "Napoleon is Emperor", "The aunt is coming with two children";
- b) Messages from the agent control station;
- c) Couriers from England, and the fact that leading personnel or organizations were picked up and taken to England for conferences and instructions.

The organization chiefs commanded the regional chiefs and specialists for special missions. Regional chiefs commanded the radio operators and special mission operatives in their area. By special missions are meant: Determining drop points; observation of vehicular traffic and transport facilities; observation of results after air attacks; espionage in the

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Luftwaffe, Army and Navy; slipping important personages over the Spanish-French border; tapping of telephone lines; pick ups, mail pick ups, and dropping operations.

By mail pick up, pick up, and dropping operations the following is meant:

Great amounts of espionage material (documents, photographs, etc.) were picked up in mail bags by aircraft. A ground crew belonging to the organization marked off the mail pick-up spot by a special arrangement of lanterns. Besides, aircraft and ground crew communicated by means of signals already agreed upon. The mail bag was fastened to a rope, and the plane cleverly picked it up in flight by means of a hook. In lonely spots, particularly in the south of France, planes landed, took on persons and documents and flew away. Money, food and "PX rations", clothes, sets, replacement parts, arms, and sabotage material were dropped by planes for the organizations. Here also a faultless cooperation between aircraft and ground crew was necessary. In case personnel was dropped by parachute, the ground crew often stood by with a car to take the new arrivals to a hiding place or to a rendezvous.

Every transmitter station had one or more alternate transmitting sites, more or less in its near neighbourhood, which were set up to provide against the possible malfunctioning of the transmitter in operation, as well as to facilitate change of position for the agent.

In some organizations one man was responsible for the whole organization. Every regional chief had at his disposal a staff of spies, "letter couriers", and observers.

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Another group of organizations worked as follows:

Teams were dropped which consisted of a chief and a man to procure the espionage material. The chief encoded the messages, and transmitted the most urgent ones himself over a VHF set to the control station, which was in a plane. His assistant had a HF transmitter. He also could encode, and when for example the VHF communications failed, he took over communication with the HF transmitter. These teams sought out their further collaborators after they arrived at their site. They went to addresses that had been given before they set out on the mission. They operated within the framework of a large organization, but their connection with this organization was relatively tenuous.

All organizations tried different means to protect themselves from being discovered.

a) Security Measures for Radio Stations

Because of the possibility of discovery by technical means, the radio stations are the most endangered links in the chain of an agent organization. For this reason they were particularly strongly secured technically. Change of call-signs, frequency, keys, time schedule for transmissions, and position of the transmitter were carried out. Agreement on transmission schedules and frequency changes was accomplished by means of a special code, when these were not worked out according to pre-arranged plan. Time of actual transmission was kept down to a minimum.

The methods of encrypting messages constantly improved. The enciphering keys would be based on bits of poetry or prose text, for example, which the encipherer had memorized. The best method seemed to be

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that the enciphering be based upon a continuous strip of paper with subtractor numbers on it (one-time encipherment pads). The encipherer cut off the cipher strip for each message after encipherment and destroyed it. In this way he was unable to decipher his own messages, even if he wanted to.

Polish organizations secured themselves against technical elimination most successfully by a special kind of transmitting sequence. When a message was to be transmitted, a whole collection of transmitters spread over all of Warsaw had the same text before them. The transmitters changed around without interrupting the sending of the message, all through the transmission. Long-range D/F's, and close-range D/F vans were irritated for a long time by this practise.

The area surrounding the transmitters was watched by observers, and protected by civilians who almost all belonged to partisan groups. For antennas, cords looking like clothes-line, with enclosed wire were used, for example; or the antennas were stretched across the inside of a room. Hiding places were provided for the sets, and endangered persons had ways of escape prepared for them. Sometimes demolition charges were built into the sets. Persons who thought their capture might endanger the organization frequently tried suicide by taking poison or shooting themselves.

b) Security measures for Transmission of Messages within the Organization

Women, children and priests were often used to deliver messages. This was learned almost always after the act, because such persons were held up by the German road control organizations only if they rendered themselves conspicuously suspicious.

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The messages were not carried directly from the sender to the recipient, but were left with "letter boxes", or intermediate stations. Barkeepers, prisoner aid bureaus, or harmless old people often served as letter boxes. The sender left the message with one of these, and the addressee had it picked up there. The middleman recognized deliverers and fetchers often by special signs and passwords.

c) Security Measures for Rendezvous

Every meeting of two or more members of organizations in line of duty was organized precisely. Certain signs or passwords were decided upon, by which the members of the rendezvous could determine, first, that the other man was the right man, and second, that he was free (not being shadowed). In most cases these rendezvous were watched from an inconspicuous place by some other member of the organization. Captured radio operators therefore almost always tried to be allowed to go to a rendezvous under the inconspicuous supervision of some one from the Gestapo. In the beginning the Gestapo agreed to such proceedings. But at rendezvous of this sort no one was ever "net", because either the radio operator let the others know that he was not free, by a secret sign, or the others, despite all camouflage, recognized the third party as a Gestapo agent. Then the whole organization was soon warned.

d) Security Measures Through Trades and Names.

The organizations and their subsections always bore cover-names. All responsible members of organizations possessed false identification papers, and used false names. These changed from time to time. The leaders carried on their activity in the organization either under cover of their actual business, or with the help of a trade for purposes of concealment. Some

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lived "underground". These had to change their place of dwelling constantly. Those who took them in were more or less aware of their activity.

In Western Europe the agent organizations could be built up on a large basis (assume for instance that as many as 50% of all Frenchmen belonged to some resistance or espionage organization). The reason for this high percentage is to be found in the fact that German propaganda did not represent an adequate counter-weight to the British, American, and even Russian propaganda. Besides, by virtue of the stupid German counter-measures taken against espionage, sabotage, and resistance groups, it was made much easier for the French to form more of such organizations. The Germans created martyrs here and there, but never took really intelligent measures to extirpate secret organizations. Radio operators and other members not quite at the top of the organizations were often not even enemies of the Germans. They worked for sporting reasons and felt themselves heroes in the process. This feeling was kept warm by the open and secret propaganda. It is clear that there were numbers of people in the organizations who worked with them for patriotic reasons, and who, in view of the Gestapo's methods of interrogation, proved to be heroes indeed. But these were exceptions. Since the percentage of men working in secret organizations in France and Belgium was very high, the German Radio Defense Corps had to limit itself to flushing out the leaders and the transmitting stations.

XI. Steps to be taken by the Secret Agent Organizations, which would render

Extirpation difficult by technical Means in the HF Band

If a Radio Defense Corps has at its disposal an extensive quantity of highly developed equipment, and sufficient personnel of superior training,

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it is in a position to eliminate practically any secret transmitter by technical means.

The agent organizations must try to bring it about that the Radio Defense Corps needs such a long time to pick up the transmitter by interception, recognize it for what it is, D/F and eliminate it, that by the time all this is accomplished the transmitter will have finished its mission; or that the transmitter can set up somewhere else before elimination is possible.

On the basis of my experience, I consider the following steps to be effective in the attainment of this end:

In the very nature of things every agent radio channel is different from every other agent channel as to procedure, characteristic quantity of traffic at given times, and peculiarities of traffic. But no net should betray characteristic peculiarities which make it easy to pick that net out from other nets. In no case should a rigid plan be followed. Everything which renders agent radio traffic characteristic as such, or which is built up according to a plan, makes the work of the intercept operator and the analyst easier.

If an agent net or a single channel suddenly and cleverly changed its procedure, it was in spite of this never difficult for our operators to recognize the channel or the net in a short time, often even at once. The reason for this was that characteristic peculiarities (footprints) and the fact that the traffic plan had remained unchanged.

Agent radio traffic must be camouflaged. I maintain that the best camouflage is the following:

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The agent must transmit like a commercial or military operator of the country in which he operates. The control station he communicates with must transmit like a commercial or military transmitter of the country to which it belongs. Both parties must be accustomed to working with each other in this way. The intercept operator of the opposing Radio Defense Corps must not be able to draw any conclusions out of the tuning traffic or message exchange of the two stations in communication with each other which would lead him to suspect that they have anything to do with one another. For instance, the fact that a British commercial transmitter, the control station, and a German military transmitter, the agent station, are working together, can be so concealed by clever management of the traffic between them, that signal intelligence is unable to find it out. The training of the control station operator and the agent must be very good. Only extremely capable personnel can be used. The training of the operators and subsequent devising of procedure can only be accomplished in close cooperation with the Signal Intelligence Service.

The advantages of this type of operations are the following:

- aa) A great number of radio procedures, all different from each other, can be devised;
- bb) No conclusive data can be drawn from long-range D/F any more. For instance, that a British commercial transmitter is in England, and a German military transmitter is in Germany does not furnish any intelligence, if it has not been established that they belong together. Only by an exact survey of all traffic, and by checking over every channel heard and D/F'ed in the area in question, can one make out whether it

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is secret agent traffic or not. The time and effort needed by a Radio Defense Corps to take effective steps against such a transmitter would be enormous.

The German Radio Defense Corps quickly learned by Radio Intelligence procedure and long-range D/F all the agent channels throughout the wide areas occupied by Germany. The Partisans Radio Counter Measures Regiment (Bandenfunk Bekämpfungs Regiment), which did not belong to the Radio Defense Corps, but which worked on the same principles, picked up and long-range D/F'ed about 600 Russian partisan transmitters behind German lines; but there were not enough close-range D/F facilities available to eliminate a sufficient quantity, just as was the case in the West. The Germans had not figured on such an enormous commitment of secret transmitters.

The traffic schedules of agent transmitters must be irregular. The agent must be able to transmit any time of the day or night, in the event that the type of traffic he handles involves this. The prerequisite condition is that the agent find the right frequency for time of day, time of year, and distance, without a lot of tuning traffic in the process. The system used in England could be used again, namely, that in the vicinity of the control stations, transmitters on different frequencies are working continuously so that the agent can pick out a frequency for his purposes without difficulty. The QRX code must not be so simple that the intercept operator can break it without help from the analysis department, which was usually the case.

The close-range teams which have been assigned to work on a transmitter already roughly located by long-range D/F, and whose transmitting schedules

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are not known, must maintain a state of constant readiness. They can no longer, as was previously the case, work on several agent transmitters a day, according to a fixed plan. Besides, the observers of the agent organization would surely notice if close-range D/F teams stay around for long periods of time in the neighbourhood.

Agent and control station transmitters must not be recognizable by their tone. The intercept operators of the Radio Defense Corps always found this very easy. Every trick of concealment used was but an illusion as long as the characteristics tone remained the same. In the future this point must be considered in designing the operating sets.

The agent's transmitting stations must change location often. The positions must be so far apart that the dead zone (skip areas) of the transmitter will be shifted considerably. In this way the close-range D/F teams, who may have gotten a line on the transmitter during one or several periods of traffic from one location, will be forced to begin their work anew. Changes of position were continually being ordered by the control stations, but were not executed often enough.

Agent transmitters must not be set up in isolated buildings, or buildings within a town but off to one side. Agents made a practise of picking out that kind of house, because they could overlook their surroundings easily. This advantage does not counterbalance the disadvantages. One single D/F bearing, shot while driving by, suffices to spot the position beyond question. If the close-range D/F men act intelligently, the agent operator will be eliminated as soon as he has finished transmitting, or in any case, later on by plain clothes men, on the basis of this

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D/F bearing. In cities, with their many back alleys and their great number of inhabitants within a small area, it is much harder to locate the operator. Besides, telephone lines, power lines, and overhead trolley cables make D/F difficult.

I know of a case in which an agent operator worked a remoted transmitter. The transmitter was in one house, and the operator sat in the other. He succeeded in arranging things so that he could disappear in time, with all his papers, when he saw the very close-range D/F man approaching the house in which he had set up the transmitter.

The method used by the Warsaw agents, who sent a message by changing around from one transmitter to another, can only be used when the organization comprises a large number of members. If this method can be used, it makes the work of the Radio Defense Corps extraordinarily difficult.

The Italians used three channels, which attempted to protect themselves from D/F in the following way:

A transmitter was set up on board the battle ship "Vittore Veneto" in the harbor of La Spezia; one near Foggia; and a third on the island of Sardinia. They broadcast the signals on CQ call up on a high output level. By the construction of the messages it could be seen that they were of a very special kind (frequent interlarding of "V's"). The traffic was transmitted on a frequency between high and medium frequencies. It started shortly before 0000, that is to say, at a time when the twilight effect still influenced D/F operations. Morse code signals were sent as modulated W/T, and the transmission was covered over with R/T from another distant transmitter, for purposes of making D/F more difficult. The Italians assumed

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this transmitter arrangement to be impossible to D/F. This was later told me by the responsible officers, such as Col. Terranova of the Comando Supremo, after we had with much technical difficulty D/F'ed the transmitter and found it to be on a battleship.

All verbal and written inquiries sent by the German Radio Defense Corps to the Italian High Command, before beginning D/F operations, received the answer that the Italians had no transmitter with the characteristics described. When I started the close-range D/F operations in La Spezia, the Italians, by order of the Italian Admiral, had me locked up, together with the men I had along to do the job. I knew that we had been shadowed for some time, with difficulty we were freed but could move only within the compound of the German U-Boat base of La Spezia.

We conducted the very close-range D/F from a small motor boat. When we told the Italians results, they said "How was it possible to D/F this transmitter? It is an experimental transmitter. We are experimenting on ways of transmitting without being D/F'ed. May we see what methods and apparatus you used to do this?"

A commission of several staff officers, accompanied by the chief of the forward station OKW/WNV/Fu. Rome, paid us a visit, looked at equipment and D/F sets, and the technique of operation. An Italian officer, whose job was the procurement of signal equipment, (a Dr. Ing.) made the statement: "It is not the equipment that does it, but the excellence of the personnel training."

German authorities assumed that the transmitter was engaged in sending treacherous messages to Russia or the Western Powers, and that they

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originated in high places.

XII. Steps to be taken by secret Agent Organization which would render
Extirpation difficult by technical Means in the VHF Band

It is of prime importance to VHF agent radio work to use the shortest possible waves. If the agent organizations had used frequencies above 100 megacycles it would have been impossible for the Radio Defense Corps to conduct a close-range D/F, because of inadequate equipment on hand and because of increased technical difficulties. If frequencies above 300 megacycles had been used, not only close-range D/F but also radio intelligence interception of the traffic would have been almost impossible, regardless of an assumed proper training and good equipment on the part of the Radio Defense Corps. Even if the control station in the aircraft were picked up every time, by dint of most intensive searching, still the locating of the close vicinity of the agent station would take so long, and need so many people to do it, that the success would be practically without meaning. In using such frequencies the control station aircraft must fly at great altitude, in order to be far enough from the agent's transmitter, without interfering with the sending and receiving conditions. The control station must remove itself far from the agent transmitter in order not to betray the approximate location of the agent's transmitter in the event that the plane is D/F'ed.

We never knew whether frequencies above 100 or 300 megacycles were used for agent traffic in Europe. I assume that there were not, for neither Radio Defense Corps nor any similar organization detected any agent traffic on these frequencies or above.

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VHF transmitters must transmit with as little power output as possible. From the Gauss tower near Kassel we heard the airborne control flying over the Zuyder Zee with such great signal strength that the Dutch language of the controller calling the agent "Johannes" sounded off from the earphones of the intercept operator like a small loud-speaker. It is impossible to miss such a transmitter as that. We shot D/F bearings on the control station all the way through Holland on 31 megacycles.

The R/T operators should dispatch their traffic more quickly than they generally did. For example, the agent "Balle" who operated from Tournay, Belgium, did it correctly, while "Johannes" often gave unnecessary bits of information which were much more interesting to the German Radio Defense Corps than they appeared to be to his control.

The control stations of the VHF channels almost always worked on 31 megacycles. This is a mistake, for it makes it easier to monitor the traffic. The same applies to VHF agent transmitting stations as was said of H/F stations with respect to changes of frequency, time schedule, and position of transmitter.

XIII. Interception and D/F of Tactical VHF channels

a) Coöperation with Army Command Posts

Tactical VHF channels were monitored on the side, by my order, although this was not our mission. I did this to show the higher German commanders what successes were possible in intercepting and D/F-ing the tactical VHF channels. I wanted to bring about the monitoring and D/F-ing of these channels on a large scale along the Western Front by the Signals

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Intelligence Service. Due to the disadvantageous developments in the military situation it was no longer possible to monitor and D/F on a large scale although the Army started it after we had proved by the successes we had how very helpful such measures could be. In this field of signal intelligence speed is all important in passing the information obtained to the proper headquarters. Every intercept and D/F team must be commanded by a tactically ^{trained} officer. This officer must have at his disposal direct communications to the higher command staffs. There must not be any central analysis station interposed between.

b) Interception and Long-Range D/F

Experience we had gained in monitoring VHF agent traffic was brought to bear in the tactical VHF interception field. Long-Range D/F's which we set up on the "Kaiserstuhl" (near Altbreisach) and in Kappelrodeck near Freudenstadt, were directed by a "Kommando" transmitter. (D/F command net). If the bearings at these distances were not accurate, they were still sufficient to enable conclusions to be drawn from texts which would have been without value had the texts not been connected with a bearing. Military areas of concentration and troop movements could be figured out in this way.

We assumed that in the Colmar region one or more agent transmitters were working under the guise of tactical stations. We D/F'ed a suspicious station of this sort near the forester's house in the "Boi de Rothlaible" south-east of Colmar, that is, back of our Front. Due to the coincidence of a number of different unfavorable circumstances I could never undertake a close-range D/F operation. The station in question worked in a purely military net of the French troops of the area. Such stations as these can

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only be recognized as agent stations by D/F of all intercepted tactical traffic.

c) Artillery Fire on tactical VHF stations serving tactical ends on the basis of DF

In order to accomplish destruction of tactical VHF transmitting stations by artillery fire directed by D/F, we set up two D/F stations two or three kilometers from the front north and south of Colmar. At the Colmar cemetery, located between the D/F men, stood the D/F command station with three transmitters. We had to be this close to the front in order to secure accurate enough D/F bearings, and so that intercept operators and D/F men could work under the same conditions of reception, that is, that all three positions would hear the same tactical transmitter. The W/T intercept operator passed over the D/F command net to the D/F operators information concerning enemy stations to be D/F'ed. These sent the bearings back to the D/F control intercept operator by W/T, as soon as they took them. He drew out the intersection of the bearings on an artillery grid map. The grid coordinate of the transmitter to be taken under fire by the artillery was reported to the CP of the artillery regiment which was to do the firing, over still another transmitter. We observed the subsequent successful results. Some transmitters were silenced immediately; others assisted in the correction of the German artillery fire by saying, for instance: "I am being fired at, but everything is dropping 20 to 30 meters to the left of me. By means of the third transmitter the D/F control intercept operator had communication with the larger main VHF intercept station of the company, set up on the "Grafernatt", or the "Herzogenhorn".

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